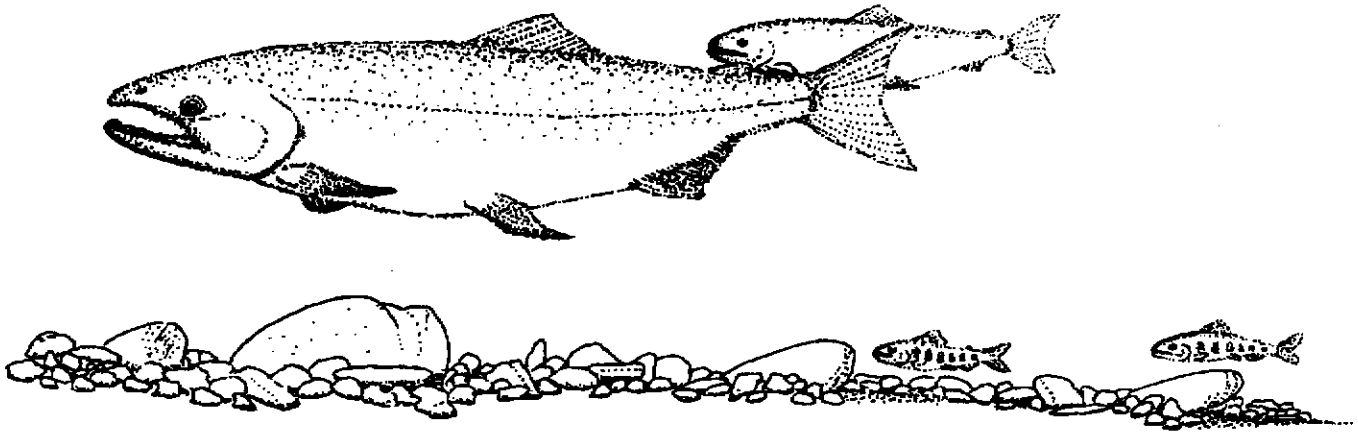
U.S. Fish & Wildlife Service

National Fish Hatchery Programming and Evaluation Activities for Puget Sound and Coastal Washington

Annual Progress Report 1996-1997

Western Washington Office
Aquatic Resources Division

Lacey, Washington
December 1998



NATIONAL FISH HATCHERY

PROGRAMMING AND EVALUATION ACTIVITIES

FOR PUGET SOUND AND COASTAL WASHINGTON

ANNUAL PROGRESS REPORT 1996-1997

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PREFACE

The purpose of this report is to document annual hatchery programming and evaluation activities at U.S. Fish and Wildlife Service fish hatcheries on the Olympic Peninsula of Washington. Although this report contains some analysis of existing data and may recommend changes to programming activities, the intent is to provide annual updates and not to provide comprehensive analysis of the various programs. Individual broodyear reports will also be prepared to describe what is known about the production and performance of different hatchery stocks by brood. Comprehensive analytical reports that encompass multiple broodyears will be produced intermittently to describe trends in survival and production of the hatchery stocks. While one person may be listed as the author of an individual report, all reports result from the collaborative efforts of the staffs of the National Fish Hatcheries, Fishery Resource Office, and Fish Health Center.

INTRODUCTION

This report contains information regarding hatchery programming and evaluation activities at Quilcene, Makah, and Quinault National Fish Hatcheries (NFH) conducted from August 1, 1996 to July 31, 1997. The information is compiled using the Fisheries Resource Evaluation Database (FRED) (USFWS, 1991), designed and maintained by the Western Washington Office, Aquatic Resources Division (Western Washington Fishery Resource Office (WWFRO)). This database provides administratively required information, biological data used to describe biological characteristics of hatchery stocks, and data to correlate fish rearing variables with survival characteristics of hatchery stocks. A general summary of the types of data routinely collected at each facility is presented in Table 1. Summarized data for this reporting period are contained in Tables 2 through 7. Specific details about the data or the database are available from WWFRO.

Fish production levels for all three hatcheries are determined in cooperation with representatives of the U.S. Fish and Wildlife Service (USFWS), tribal staffs, and the Washington Department of Fish and Wildlife (WDFW). Harvest levels, stock survival rates, wild stock interactions, and hatchery production capabilities are all considered when establishing production numbers. Programmed production goals for the broods reported in this document are presented in Table 2.

Hatchery evaluation teams for each hatchery met as specified by the USFWS Region 1 Vision Action Plan. The teams function as a focal point for involved Fish and Wildlife Service employees to participate in the programming and evaluation of the hatchery products. Membership includes hatchery staff, Olympia Fish Health Center staff, and WWFRO staff.

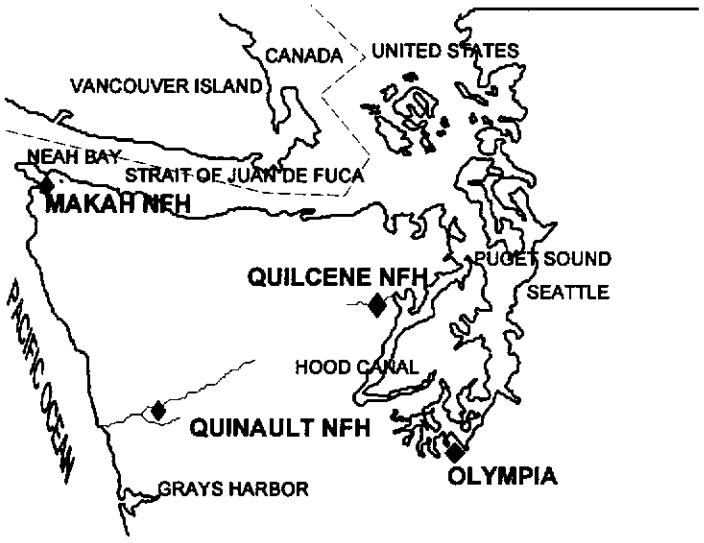

Figure 1. Western Washington locale map.

QUILCENE NATIONAL FISH HATCHERY

The Quilcene NFH production program operates under the guidance of the Hood Canal Management Plan and the Hood Canal Production Evaluation Program (brood years 1988-1993). Fish production levels are determined cooperatively with representatives from the USFWS, Point No Point Treaty Council, and WDFW. Summer chum continue as a high priority program at the hatchery. Hood Canal summer chum are named as a stock of concern in a petition for listing under the Endangered Species Act.

Coho

Releases and Transfers: Coho production at Quilcene NFH included 425,971 Quilcene stock yearlings and 50,000 fry released upstream in lieu of adult passage. In February, 1997 we transferred 225,288 Quilcene coho pre-smolts from the 1995 brood to the Skokomish tribe for rearing at their Quilcene Bay net-pen facility. We also transferred 532,875 eyed eggs to the George Adams state fish hatchery for subsequent hatching, rearing, and transfer to the Port Gamble tribal net pen program.

Tags and Marks Applied: We coded-wire tagged 45,095 coho for the Quilcene Bay net pen program and 50,321 coho for the on-station release.

Terminal Area Returns, 1996: Adult returns provided sufficient spawners to meet program needs for 1996. Escapement to the hatchery was 8,146. Net fisheries harvested 2,894 coho in the terminal fishery in Quilcene Bay.

Recoveries of Coded-Wire Tags: All returning coho to the hatchery were sampled for coded-wire tags. 838 tags were recovered, representing seven different codes. Two hundred and fifty-four (30%) of these tag recoveries were from coho that originated from releases from net-pen programs in Port Gamble and Quilcene Bays. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries also catch Quilcene NFH coho.

Discussion/Recommendations: The coho program at Quilcene continues to support a major terminal fishery in Quilcene Bay. Due to the earlier run timing of Quilcene stock coho, there is concern about the interception harvest of summer chum, which enter Quilcene Bay simultaneously. Fishery managers have modified the terminal coho fishery to emphasize beach seine methods, which allow fishers to return summer chum to the water alive.

Spring Chinook

Releases and Transfers: The hatchery released no spring chinook during this period. This program has been terminated due to poor survival rates.

Terminal Area Returns, 1996: A total of 15 spring chinook adults returned to the hatchery rack. The run fell far short of the required escapement of 500 adults. We biosampled 80% of the return to find age composition. Age four fish were most common.

Recoveries of Coded-Wire Tags: All spring chinook returning to the hatchery were sampled for coded-wire tags. We recovered 5 tags representing four different codes. One recovery was from a spring chinook released at the Hood Canal state fish hatchery in Hoodsport. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries catch Quilcene spring chinook.

Discussion/Recommendations: This program has been discontinued at Quilcene due to poor return rates and the lack of a genetically pure donor stock. All adults were disposed of this reporting period, as the state program at the Hood Canal Hatchery has also been discontinued.

Summer Chum

Releases and Transfers: The hatchery released a total of 612,598 feeding summer chum fry in 1997. No summer chum were marked or tagged. We transferred 168,000 eyed summer chum eggs and 40,000 sacfry to WDFW for rearing and reintroduction into Big Beef Creek.

Terminal Area Returns, 1996: Seven hundred seventy-one adult summer chum were handled at the hatchery. These fish came from returns to the hatchery rack and from broodstocking conducted in the coho fishery held in Quilcene Bay. In addition, an estimated 8,479 fish remained in the river and spawned naturally. We biosampled 62% of the summer chum at the hatchery to determine age composition. Four-year-old fish predominated in the run processed at the hatchery.

Recoveries of Coded-Wire Tags: All summer chum returning to the hatchery were sampled for coded-wire tags from fish released from the 1992 brood. We recovered 61 tags representing two different codes.

Discussion/Recommendations: The returns of tagged four-year-old fish indicate positive results from hatchery supplementation of the 1992 brood.

Fall Chum

Releases and Transfers: The hatchery released 1,628,871 feeding chum fry into the Big Quilcene River.

Terminal Area Returns, 1996: A total of 3,758 adult fall chum returned to the hatchery rack. In addition, an estimated 12,160 fish remained in the river and spawned naturally. We biosampled 19% of the hatchery return to determine age composition. Most of the fish were three years old. Run reconstruction by WDFW shows that over 12,000 fall chum (9,000 natural origin, 3,000 hatchery origin) from the Quilcene River system were caught in 1996 net fisheries in Washington waters.

Discussion/Recommendations: This program continues successfully as a composite of hatchery and natural production.

MAKAH NATIONAL FISH HATCHERY

Guidance for fish production at Makah NFH is provided through a steering committee with representation from the USFWS, the Makah Tribe, and WDFW. Coho brood 1996 will be treated with an experimental furunculosis vaccine, as was the 1995 brood. The coho, steelhead, and chinook programs are successfully building.

Coho

Releases and Transfers: Coho production at Makah NFH included 232,300 yearlings and 448,000 subyearlings released into the Sooes River. We transferred 45,646 subyearling coho to the Makah Tribe for further rearing, imprinting, and release at their Educket Creek facility on the Waatch River system.

Tags Applied: In December 1996 we applied coded-wire tags to 45,095 yearling coho for the Sooes River release and 30,390 coho for the transfer to Educket Creek.

Terminal Area Returns, 1996: Coho returns provided sufficient spawners to meet program needs for 1996. Escapement to the hatchery was 5,595. Of these, we passed 3,603 fish upstream of the weir to contribute to natural production. The Sooes River net fishery harvested 6,428 coho in the river below the hatchery.

Recoveries of Coded-Wire Tags: Sixty-seven percent of the coho returning to the hatchery were sampled for coded-wire tags. Three hundred eighteen tags were recovered, representing seven different codes. Expansion of tags to account for subsampling of fish passed upstream yields an estimate of 484 tagged fish recovered. One hundred and four of these tags, representing an estimated 158 tagged fish, originated from releases made from the Educket Creek facility. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries also catch Makah NFH coho.

Discussion/Recommendations: We abandoned our previous efforts to separate the timing of the coho run and the chinook run. We were unsuccessful in creating a separation in run timing during the relatively few years of the program, and the chinook run is building to a point where incidental or directed take of chinook during coho fisheries will not negatively impact the program.

Fall Chinook

Releases and Transfers: The hatchery released 95,000 fall chinook in early April and 2,466,427 fall chinook fingerlings in late May and early June. We are continuing to attempt a strategy of releasing chinook as late as possible (depending on water availability) to improve survival. Since the hatchery did not meet its production goal of 3,300,000 fish, no chinook were available for transfer to the tribal facility at Educket Creek.

Tags Applied: A total of 135,416 fall chinook was coded-wire tagged in May 1997. These fish are an indicator group for the Pacific Salmon Treaty chinook stock rebuilding program. We were unable to meet our goal of tagging 250,000 fall chinook due to furunculosis infection.

Terminal Area Returns, 1996: A total of 3,586 fall chinook returned to the hatchery rack. We biosampled 29% of the return to determine age composition. Age three fish were most common. We passed 319 chinook above the hatchery to spawn in the Sooes River. Eight chinook were reported captured in coho net fisheries in the lower Sooes River.

Recoveries of Coded-Wire Tags: All fall chinook kept at the hatchery were sampled for coded-wire tags. One hundred sixty-five tags were recovered, representing 13 different codes. One tags was recovered from fish released from the Makah Tribe's Hoko River rearing facility. Expansion of tags to account for subsampling of fish passed upstream yields an estimate of 186 tagged fish recovered. Besides hatchery recoveries, Canadian, Alaskan, and Washington sport and commercial fisheries catch Makah NFH fall chinook.

Discussion/Recommendations: The chinook program continues to build at Makah. Prospects are good for a directed chinook fishery in the Sooes River. A recurring problem at the hatchery is the lack of water in the Sooes River when adult chinook return. The hatchery is unable to operate the fish ladder until fall flows increase and adults must hold in the river below the weir.

Winter Steelhead

Releases and Transfers: The hatchery released a total of 184,376 steelhead yearlings and 384,000 subyearling fish into the Sooes River. Twenty-five thousand steelhead subyearlings were transferred to the Makah Tribe for rearing at their Educket Creek facility.

Marks Applied: No steelhead were marked. Previously marked year classes indicate that hatchery origin steelhead have a well-defined earlier return timing than wild origin steelhead.

Terminal Area Returns, 1996-97: A total of 483 adult steelhead returned to the hatchery rack from October 4 to January 23. After that time the ladder was closed and fish were allowed to pass upstream uncounted. Based previous mark recoveries, we know that fish returning in the fall and winter are of hatchery origin and that fish returning in the early spring are of wild origin. We biosampled 64% of the hatchery steelhead to find age composition. Most of the fish were three-year-olds. A total of 2,153 steelhead was caught in net fisheries in the Sooes and Waatch Rivers.

Fall Chum

Releases and Transfers: The hatchery released no chum fry in 1997.

Terminal Area Returns, 1996: Eighty adult fall chum returned to the hatchery rack. All fish were passed upstream to spawn in the Sooes River.

Discussion/Recommendations: This program has been discontinued The chum run in the Sooes River has historically been small as there is limited estuarine area for juvenile growth. The production program was founded with outside stocks, which have been unsuccessful at increasing the run size.

QUINAULT NATIONAL FISH HATCHERY

Production levels for Quinault NFH are set through joint agreement between the USFWS and the Quinault Tribe in a steering committee. We forwarded three items to policy representatives for resolution: language changes to the cooperative agreement, options for managing risk to the Quinault NFH fall chinook broodstock program, and an unfunded plan for a coho rearing density study. This year the Service conducted weekly spawning surveys for fall chinook on the two miles of Cook Creek below the hatchery. Coded-wire tags from the surveys, numbers of live and dead fish observed, and redd counts were provided to Quinault Tribal fisheries for expansion and reporting. The Chinook Technical Committee of the Pacific Salmon Commission has requested the escapement information in order to use the Quinault River stock as an indicator group.

Coho

Releases and Transfers: Coho production at Quinault NFH included 625,040 yearlings released on-station. Coho transferred to other locations included 125,000 to the tribal facility at Salmon River and 48,277 to the tribal facility at Quinault Lake.

Tags Applied: We applied coded-wire tags to 80,508 coho yearlings in November 1996 for the on-station release to Cook Creek.

Terminal Area Returns, 1996: Coho returns provided sufficient spawners to meet program needs for 1996. Escapement to the hatchery was 6,555 adults and jacks. The Quinault River net fishery harvested an estimated 3,692 fish of Quinault NFH origin.

Recoveries of Coded-Wire Tags: We sampled all coho returning to the hatchery for coded-wire tags. Four hundred ninety-eight tags were recovered, representing nine different codes. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries also catch Quinault NFH coho.

Discussion/Recommendations: Coho density levels are being held low in an attempt to produce smolts with a lower incidence of bacterial kidney disease. It is thought that kidney disease may be a factor in the low coho survival rates (~2.0% mean) seen at Quinault NFH.

Fall Chinook

Releases and Transfers: The hatchery released 509,359 fall chinook fingerlings of mixed Cook Creek and Quinault Lake stocks into Cook Creek.

Tags Applied: In June 1997 we coded-wire tagged 204,979 fall chinook for release into Cook Creek. This release is tagged as an indicator group for the Pacific Salmon Commission chinook's stock rebuilding program.

Terminal Area Returns, 1996: Ninety-five fall chinook returned to the hatchery rack. We scale sampled 57% of the fish at the hatchery to determine age composition. Most of the fish were four years old. Spawning escapement to the Quinault system was estimated to include 517 Quinault NFH origin adults. An estimated 1,325 chinook of Quinault NFH origin were caught in Quinault River fisheries.

Recoveries of Coded-Wire Tags: All fall chinook handled at the hatchery were sampled for coded-wire tags. We recovered 46 tags, representing 11 different codes. Besides hatchery recoveries, Canadian, Alaskan, and Washington sport and commercial fisheries catch Quinault NFH fall chinook.

Discussion/Recommendations: Insufficient broodstock were obtained to meet the programmed production of 600,000 chinook. Broodstock were obtained from the hatchery rack and from tended gillnets fished at the tribe's Quinault Lake net pen facility.

Winter Steelhead

Releases and Transfers: The hatchery released 207,451 yearling steelhead at the hatchery and 58,970 at Allen's Bar on the Hoh River. A release of 35,056 sub-yearling steelhead was made into the Raft River. Transfers to tribal facilities included 49,975 fish to the Hoh Tribal facility at Chalaat Creek.

Tags and Marks Applied: Coded-wire tags were applied to 30,415 steelhead for the on-station release to Cook Creek. A total of 16,147 steelhead for transfer to the Chalaat Creek facility was coded-wire tagged and 33,929 fish were adipose-clipped only. A total of 17,691 steelhead for the release at Allen's Bar on the Hoh River was coded-wire tagged and an additional 41,666 fish for this release were adipose clipped to identify them as hatchery fish. Tagging and clipping was conducted in November and December 1996.

Terminal Area Returns, 1996-97: A total of 2,703 adult steelhead returned to the hatchery rack. We biosampled 20% of the returning steelhead to determine age composition. Most of the fish were three-year-olds. An estimated 2,600 steelhead were caught in terminal fisheries in the 1996-97 catch year.

Recoveries of Coded-Wire Tags: All returning steelhead were sampled for coded-wire tags. Three hundred seventy-six tags were recovered, representing 11 different codes. Thirty-six of these tag recoveries were from fish released at the Quinault Tribal facility at Salmon River (Queets), the Humptulips state fish hatchery, or from Quinault NFH origin steelhead transferred to other facilities or released off-station, at Chalaat Creek, or Hoh River.

Discussion/Recommendations: The steelhead program continues to support a vigorous net fishery in the Quinault River and a sport fishery in both the Quinault River and Cook Creek.

Fall Chum

Releases and Transfers: The hatchery released a total 97,468 feeding chum fry in 1997.

Terminal Area Returns, 1996: A total of 127 adult fall chum returned to the hatchery rack. We biosampled 93% of the rack return to determine age composition. Age three fish were most common. Considerable spawning has been documented in Cook Creek below the hatchery rack.

Discussion/Recommendations: The large spawning population of chum in Cook Creek supports the notion that this stock should be considered a wild/hatchery composite.

ACKNOWLEDGMENTS

Much of the data required for hatchery evaluation, programming, and coordination is collected solely by hatchery staff. That which is not is collected cooperatively with WWFRO staff. Many suggested program changes and evaluation ideas originate from hatchery personnel. Makah, Quinault, and Quilcene NFH staff have contributed significantly to the current success and future direction of the hatcheries through their innovative ideas and cooperative natures. Fishery catch data are the result of sampling programs conducted by the WDFW, Northwest Indian Fish Commission, and the Quinault Department of Natural Resources.

LITERATURE CITED

USFWS. 1991. Fisheries Resource Evaluation Database Users Manual. Western Washington Fishery Resource Office. Olympia, Washington. 131pp.

Table 1. Fisheries Resource Evaluation Database (FRED) data collected from Olympic Peninsula hatcheries, August 1, 1996 to July 31, 1997.

	Quilcene NFH				Makah NFH				Quinault NFH			
	Coho	Spring chinook	Summer chum	Fall chum	Coho	Fall chinook	Winter steelhead	Fall chum	Coho	Fall chinook	Winter steelhead	Fall chum
Adult entry	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Fish removal	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Group spawning	✔		✔	✔	✔	✔	✔		✔	✔	✔	✔
Mark sampling	✔	✔	✔		✔	✔			✔	✔	✔	
Mark recovery	✔	✔	✔		✔	✔			✔	✔	✔	
Scale sample		✔	✔	✔		✔	✔			✔	✔	✔
Marking	✔				✔	✔			✔	✔	✔	
Fish/egg transfer	✔		✔		✔		✔		✔	✔	✔	
General release	✔		✔	✔	✔	✔	✔		✔	✔	✔	✔
Specific release	✔		✔	✔	✔	✔	✔		✔	✔	✔	✔

Table 2. Programmed production for broods released from Olympic Peninsula hatcheries, 8/1/96 - 7/31/97.

Hatchery	Species	Broodyear	Life stage	Number to release	Number to transfer
Quilcene NFH	Coho	1996	egg	0	450,000
	Coho	1995	smolt	450,000	300,000
	Summer chum	1996	fed-fry	400,000	200,000
	Fall chum	1996	fed-fry	2,200,000	0
Makah NFH	Coho	1995	smolt	250,000	50,000
	Fall chinook	1996	smolt	3,200,000	100,000
	Winter steelhead	1996	smolt	175,000	25,000
Quinault NFH	Coho	1995	smolt	660,000	0
	Fall chinook	1996	smolt	600,000	0
	Winter steelhead	1996	smolt	240,000	0
	Winter steelhead	1996	fingerling	0	50,000
	Fall chum	1996	fed-fry	1,500,000	0

Table 3. Release and tagging information for Olympic Peninsula hatcheries, August 1, 1996 to July 31, 1997.

Hatchery	Species	Brood	Stock	Release site	Release date(s)	Size at release (g)	Tagcode	Tags released	Ad-only released	Untagged released	Percent of release tagged	Month tagged	Size at tagging (g)	Tag retention rate (%)
Quilcene	Coho	95	"	"	05/02/97	29.0	054040	12,259	433	95,473	11.6	Nov 96	20.6	96.6
	"	95	"	"	05/02/97	29.0	054041	12,442	75	94,157	11.6	Nov 96	20.6	99.4
	"	95	"	"	05/02/97	29.0	054042	12,414	74	93,939	11.6	Nov 96	20.6	99.4
	"	95	"	"	05/02/97	29.0	054043	12,116	170	92,419	11.6	Nov 96	20.6	98.6
	"	96	"	"	04/10/97	1.3				50,000				
	Summer chum	96	"	"	04/10/97	1.3				612,598				
	Fall chum	96	Quilcene River	Quilcene River	05/12/97	0.6				1,584,386				
	"	96	"	"	06/09/97	0.9				44,485				
Makah	Coho	95	Sooes River	Sooes River	04/21/97-04/22/97	33.3	054062(v)	8,833	109	37,229	19.1	Dec 96	19.7	98.8
	"	95	"	"	04/21/97-04/22/97	33.3	054063(c)	8,748	272	37,554	19.1	Dec 96	19.7	97.0
	"	95	"	"	04/21/97-04/22/97	33.3	054105(c)	8,886	93	37,383	19.1	Dec 96	19.7	98.9
	"	95	"	"	04/21/97-04/22/97	33.3	054106(v)	8,991	73	37,737	19.1	Dec 96	19.7	99.2
	"	95	"	"	04/21/97-04/22/97	33.3	055016(v)	8,699	286	37,408	18.8	Dec 96	19.7	96.8
	"	96	"	"	02/18/97-03/10/97	0.4				448,000				
	Fall chinook	96	"	"	04/02/97	0.5				95,000				
	"	96	"	"	05/23/97-06/05/97	6.3	054052	47,805	17,351	1,132,606	4.3	May 97	3.8	73.4
	"	96	"	"	05/23/97-06/05/97	6.3	054053	58,102	10,911	1,199,652	4.3	May 97	3.8	84.2
	Winter steelhead	96	"	"	04/11/97-04/16/97	69.5				184,376				
	"	97	"	"	03/28/97-04/21/97	0.2				212,000				
	"	97	"	"	05/19/97	0.6				172,000				
Quinault	Coho	95	"	"	05/01/97	27.4	054215	19,949	197	138,334	12.5	Nov 96	14.6	99.0
	"	95	"	"	05/01/97	27.4	054216	18,240	643	129,662	12.5	Nov 96	14.6	96.6
	"	95	"	"	05/01/97	27.4	054217	20,481	80	141,184	12.5	Nov 96	16.2	99.6
	"	95	"	"	05/01/97	27.4	054218	19,559	306	136,405	12.5	Nov 96	13.0	98.5
	Fall chinook	96	mixed	"	07/15/97	7.1	054219	45,072	6,222	77,353	36.2	Jun 97	3.9	87.9
	"	96	"	"	07/15/97	7.1	054220	45,738	4,238	75,365	36.2	Jun 97	3.5	91.5
	"	96	"	"	07/15/97	7.1	054221	45,581	3,552	74,094	36.2	Jun 97	3.8	92.8
	"	96	"	"	07/15/97	7.1	054222	47,767	4,921	79,455	36.2	Jun 97	3.7	90.7
	Winter steelhead	96	Cook Creek	"	06/04/97	90.8				9,350				
	"	96	"	"	05/13/97-05/15/97	88.9	213030	14,789	154	87,711	13.9	Nov 96	32.4	99.0
	"	96	"	"	05/13/97-05/15/97	88.9	213031	12,751	1,143	81,553	13.9	Nov 96	32.4	91.8
	"	96	"	Hoh River	05/07/97-05/08/97	65.1	TH0002	16,551	1,025	42,419	27.6	Dec 96	30.2	94.2
	"	97	"	Raft River	07/01/97	1.8				35,056				
	Fall chum	96	Cook Creek	Cook Creek	04/22/97	1.1				97,468				

Table 4. Transfer information for Olympic Peninsula hatcheries, August 1, 1996 to July 31, 1997.

Hatchery	Species	Brood	Stock	Transferred to	Date transferred	Size at transfer (g)	Number of fish
Quilcene	Coho	95	Quilcene	Quilcene Bay Net Pens	02/18/1997	23.2	225,288
"	Summer chum	96	Quilcene	Big Beef Creek	01/16/1997	0.4	40,000
Makah	Coho	95	Makah	Educket Creek	03/04/1997	23.9	45,646
"	Winter steelhead	96	Makah	Educket Creek	04/16/1997	63.1	25,000
Quinault	Coho	96	Quinault	Salmon River	07/01/1997	2.9	100,000
"	Coho	96	"	Salmon River	07/31/1997	4.2	25,000
"	Coho	96	"	Quinault Lake	07/31/1997	3.1	48,277
"	Winter steelhead	96	"	Chalaat Creek	02/25/1997	49.3	49,975

Table 5. Rack return of salmon and steelhead to Olympic Peninsula hatcheries, August 1, 1996 to July 31, 1997.

Hatchery	Species	Number returned
Quilcene NFH	Coho	8,146
	Spring chinook	15
	Fall chinook	1
	Summer chum[1]	771
	Fall chum	3,758
	Sockeye	3
Makah NFH	Coho	5,595
	Fall chinook	3,586
	Winter steelhead	483
	Fall chum	80
	Cutthroat	1
Quinault NFH	Coho	6,555
	Fall chinook	95
	Winter steelhead	2,703
	Fall chum	127

[1] From broodstocking efforts and rack return.

Table 6. Age composition of salmon and steelhead returning to Olympic Peninsula hatcheries, 1996-97, in percent.

Species	Hatchery	age 2	age 3	age 4	age 5	age 6	percent of run aged
Spring chinook	Quilcene	0	0	67	33	0	80
Fall chinook	Makah	1	50	46	3	0	29
	Quinault	4	7	57	26	6	57
Winter steelhead	Makah	1	71	27	1	0	64
	Quinault	1	58	42	0	0	20
Summer chum	Quilcene	2	4	94	0	0	62
Fall chum	Quilcene	0	49	49	2	0	19
	Quinault	0	43	37	19	0	93

Table 7. Recoveries of coded-wire tags from Olympic Peninsula hatcheries, 8/1/96 - 7/31/97.

Hatchery	Species	Number of codes	Number of tags	Expansion factor
Quilcene NFH	Coho	7	838	1.01
	Spring chinook	4	5	1.00
	Fall chinook	1	1	1.00
	Summer Chum	2	61	1.02
Makah NFH	Coho	7	318	1.52
	Fall chinook	13	165	1.13
Quinault NFH	Coho	9	498	1.04
	Fall chinook	11	46	1.02
	Winter steelhead	11	376	1.03
			2,308	